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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,537	09/24/2004	Tony Yang	OMCP0003USA	5536

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NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION  
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EXAMINER

HU, RUI MENG

ART UNIT PAPER NUMBER

2618

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	04/03/2007	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

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**Office Action Summary**

Application No.

10/711,537

Applicant(s)

YANG, TONY

Examiner

RuiMeng Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 September 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 September 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>01/16/2006</u>  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement submitted on 01/16/2006 been considered by the Examiner and made of record in the application file.

### *Drawings*

2. Figure 5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1-6, 9-14 and 17-18** are rejected under 35 U.S.C. 102(e) as being anticipated by **Mourant (US Patent 6687494)**.

Consider **claim 1**, Mourant clearly discloses an image rejection mixer comprising (Abstract, figures 1a and 1b): an in-phase mixer for mixing a received RF signal with an in-phase reference signal to produce a current mode in-phase mixed signal (column 1 lines 36-50, using a 90 degree phase shifted version of the local oscillator signal, commonly known as I and Q signals); a quadrature-phase mixer for mixing the received RF signal with a quadrature-phase reference signal to produce a current mode

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quadrature-phase mixed signal, the quadrature-phase reference signal and the in-phase reference signal having a substantially orthogonal phase difference (considering I and Q signals are in 90 degree phase difference); and a polyphase filter network (figures 1a and 1b, phase shifter and combining circuit 24 and phase shifter and combining circuit 25, column 2 lines 43-53, the 90 degree phase shifters are commonly implemented in semiconductor integrated circuits using polyphase networks) having inputs receiving the current mode in-phase mixed signal (output of mixer 8) and the current mode quadrature-phase mixed signal (output of mixer 9).

Consider **claim 2 as applied to claim 1**, Mourant clearly discloses wherein the inputs of the polyphase filter network are directly connected to the outputs of the in-phase mixer and the quadrature-phase mixer (see figures 1a and 1b, polyphase networks 24 and 25 are directly connected with doubly balanced mixers 8 and 9).

Consider **claim 3 as applied to claim 1**, Mourant clearly discloses further comprising an inductor coupled between an output of the polyphase filter network and a supply voltage to convert an output of the image rejection mixer to a voltage mode signal (figures 1a and 1b, inductors 43 and 44, supply voltage Vcc).

Consider **claim 4 as applied to claim 1**, Mourant clearly discloses wherein the received RF signal, the in-phase reference signal, and the quadrature-phase reference signal are differential signals; the in-phase and quadrature-phase mixers are differential mixers (Abstract); and the polyphase filter network has two differential inputs and one differential output (figure 1a, polyphase network 24 has two differential inputs and one differential output 46).

Consider **claim 5 as applied to claim 4**, Mourant clearly discloses further comprising a differential inductor coupled to the differential output of the polyphase filter network and having a center tap being coupled to a supply voltage to convert a differential output of the image rejection mixer to a differential voltage mode signal (column 2 lines 58-64, figure 1a, inductor 44 coupled to the output of the polyphase network 24 and supply voltage Vcc).

Consider **claim 6 as applied to claim 1**, Mourant clearly discloses wherein the polyphase filter network is a single-stage poly-phase filter network (polyphase filter network 24 is a single-stage poly-phase filter network).

Consider **claim 9**, Mourant clearly discloses a method of mixing a received RF signal with a reference signal and removing an image signal component, the method comprising (Abstract, figure 1): mixing the received RF signal with an in-phase reference signal to produce a current mode in-phase mixed signal; mixing the received RF signal with a quadrature-phase reference signal to produce a current mode quadrature-phase mixed signal (column 1 lines 36-50, using a 90 degree phase shifted version of the local oscillator signal, commonly known as I and Q signals), the quadrature-phase reference signal and the in-phase reference signal having a substantially orthogonal phase difference (considering I and Q signals are in 90 degree phase difference); and providing a polyphase filter network (figures 1a and 1b, phase shifter and combining circuit 24 and phase shifter and combining circuit 25, column 2 lines 43-53, the 90 degree phase shifters are commonly implemented in semiconductor integrated circuits using polyphase networks) to receive the current mode in-phase

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mixed signal (output of mixer 8) and the current mode quadrature-phase mixed signal (output of mixer 9), so as to generate a resultant IF signal; wherein the image signal component is cancelled from the resultant IF signal (polyphase filter network 24 and 25 directly coupled to the outputs of the doubly balanced mixers 8 and 9, and produce intermediate frequency signal substantially free of signal images at outputs 45 and 46).

Consider **claim 10 as applied to claim 9**, Mourant clearly discloses wherein the inputs of the polyphase filter network are directly connected to the current mode in-phase mixed signal and the current mode quadrature-phase mixed signal (figure 1, polyphase filter network 24 and 25 directly coupled to the outputs of the doubly balanced mixers 8 and 9).

Consider **claim 11 as applied to claim 9**, Mourant clearly discloses further comprising converting an output signal of the polyphase filter network to a voltage mode signal using an inductor coupling the output signal of the polyphase filter network to a supply voltage (column 2 lines 58-64, figure 1a, inductor 44 coupled to the output of the polyphase network 24 and supply voltage Vcc).

Consider **claim 12 as applied to claim 9**, Mourant clearly discloses wherein the received RF signal, the in-phase reference signal, the quadrature-phase reference signal, the in-phase mixed signal, and the quadrature-phase mixed signal are differential signals (Abstract); and the polyphase filter network has two differential inputs and one differential output (figure 1a, polyphase network 24 has two differential inputs and one differential output 46).

Consider **claim 13 as applied to claim 12**, Mourant clearly discloses further comprising converting a differential output signal of the polyphase filter network to a differential voltage mode signal using a differential inductor coupled to the differential output of the polyphase filter network and having a center tap being coupled to a supply voltage (column 2 lines 58-64, figure 1a, inductor 44 coupled to the output of the polyphase network 24 and supply voltage Vcc).

Consider **claim 14 as applied to claim 9**, Mourant clearly discloses wherein the polyphase filter network is a single-stage polyphase filter network (polyphase filter network 24 is a single-stage poly-phase filter network).

Consider **claim 17**, Mourant clearly discloses an image rejection mixer comprising (Abstract, figure 1): an in-phase mixer for mixing a received RF signal with an in-phase reference signal to produce an in-phase mixed signal at outputs of the in-phase mixer; a quadrature-phase mixer for mixing the received RF signal with a quadrature-phase reference signal to produce a quadrature-phase mixed signal at outputs of the quadrature-phase mixer (column 1 lines 36-50, using a 90 degree phase shifted version of the local oscillator signal, commonly known as I and Q signals), the quadrature-phase reference signal and the in-phase reference signal substantially having a substantially orthogonal phase difference (considering I and Q signals are in 90 degree phase difference); and a polyphase filter network (figures 1a and 1b, phase shifter and combining circuit 24 and phase shifter and combining circuit 25, column 2 lines 43-53, the 90 degree phase shifters are commonly implemented in semiconductor integrated circuits using polyphase networks) having inputs receiving the in-phase

mixed signal (output of mixer 8) and the quadrature-phase mixed signal (output of mixer 9); wherein the outputs of the in-phase mixer (doubly balanced mixer 8) and the outputs of the quadrature-phase mixer (doubly balanced mixer 9) are cascaded to the polyphase filter network (figure 1).

Consider **claim 18 as applied to claim 17**, Mourant clearly discloses wherein the inputs of the polyphase filter network are directly connected to the outputs of the in-phase mixer and the quadrature-phase mixer (figure 1, the inputs of the polyphase filter network 24 and 25 are directly connected to the outputs of the doubly balanced mixers 8 and 9).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.



7. **Claims 7-8 and 15-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Mourant (US Patent 6687494)** in view of **Wang (US Patent 6999746)**.

Consider **claim 7 as applied to claim 1**, Mourant fails to disclose wherein the in-phase and quadrature-phase mixers are Gilbert mixers.

In the same field of endeavor, Wang clearly discloses the in-phase and quadrature-phase mixers are Gilbert mixers (figure 2, Gilbert cell 1 and Gilbert cell 2).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection techniques taught by Wang into the art of Mourant as to include Gilbert mixers as an alternate choice.

Consider **claim 8 as applied to claim 7**, Mourant as modified by Wang clearly discloses wherein the in-phase and quadrature-phase mixers are combined into one mixer unit having open drain outputs cascoded with the inputs of the polyphase filter network (figure 1, mixers 8 and 9 are interacted with one another, and having outputs directly connected with the inputs of the polyphase filter network 24 and 25).

Consider **claim 15 as applied to claim 9**, Mourant clearly discloses further comprising (figure 1): providing an in-phase mixer 8 used for mixing the received RF signal with the in-phase reference signal to produce the in-phase mixed signal; and providing a quadrature-phase mixer 9 used for mixing the received RF signal with the quadrature-phase reference signal to produce the quadrature-phase mixed signal.

However, Mourant fails to disclose wherein the in-phase and quadrature-phase mixers are Gilbert mixers.

In the same field of endeavor, Wang clearly discloses the in-phase and quadrature-phase mixers are Gilbert mixers (figure 2, Gilbert cell 1 and Gilbert cell 2).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection techniques taught by Wang into the art of Mourant as to include Gilbert mixers as an alternate choice.

Consider **claim 16 as applied to claim 15**, Mourant as modified by Wang clearly discloses wherein the in-phase and quadrature-phase Gilbert mixers are combined into one mixer unit having open drain outputs cascoded with the inputs of the polyphase filter network (figure 1, mixers 8 and 9 are interacted with one another, and having outputs directly connected with the inputs of the polyphase filter network 24 and 25).

### ***Conclusion***

Any response to this Office Action should be **faxed to (571) 273-8300 or mailed to:**

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**Hand-delivered responses** should be brought to

Customer Service Window  
Randolph Building  
401 Dulany Street  
Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RuiMeng Hu whose telephone number is 571-270-1105. The examiner can normally be reached on Monday - Thursday, 8:00 a.m. - 5:00 p.m., EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on 571-272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RuiMeng Hu  
R.H./rh  
March 22, 2007

EDAN ORGAD  
PRIMARY PATENT EXAMINER

*Edan Orgad* 3/20/07